# Industrial Finishing

## An Independent Publication Devoted To The Finishing of Industrial Products

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Future Foreman Finishers
Many Concerns Still Troubled with Blushing
When Satisfaction is Registered, Learn Why


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# With the Editor

AUTUMN activity begins this month and while the political activity of a Presidential year is not to be entirely ignored, INDUSTRIAL FINISHING chooses to confine its articles and discussions to the many important subjects that concern its thousands of readers continuously and permanently—in and out of season. Goods must be well finished regardless of who is being boosted or lambasted politically, because today the character of the finish on factory products carries a greater responsibility than ever before.

Inquiries recently submitted to this office show considerable interest in tumbled and dipped lacquer finishes for small articles. Mechanical striping, rubbing, polishing, staining, graining, spraying, ventilation, drying, bake-finishing and relief from blushing are only a few of the additional subjects about which specific and definite information is requested.

Indeed, here is a wealth of subjects for editorial discussion—all of them vitally important to individuals and manufacturing establishments in the industry. As needs become apparent and troubles occur, materials, supplies, equipment and methods are being continually developed and improved to take care of every problem and condition—the ultimate objective being greater durability and added attractiveness at lower costs, when possible.

Information concerning these improvements is being continually featured in every issue of INDUSTRIAL FINISHING by writers who are not only well informed, but who are always in close touch with specific phases of industrial finishing progress.

O. H. Rohr

Managing Editor

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*"It may be that this will need censoring, because it is possible that it will be distasteful to some readers; nevertheless you will agree with me that it is a fact.*

*"Before forwarding it to you, I had several chemists and sales representatives look it over, their general opinion being that it did not emphasize the facts strongly enough, and should have been in print years ago."—*

Joseph F. Schmoegner

# An Effective Way to Sell Finishes

***Superintendent of painting department submits some experiences he has had in the use of finishing materials and calls attention to great industrial wastes, incident to shortcomings of some industrial finishing salesmen***

**By Joseph F. Schmoegner**

THE importance of a competent technical man to increase sales in the paint, varnish, and lacquer industry is evident. For the past 15 years I have had dealings with paint salesmen, and will say that I have found very few that knew anything at all about the application of materials. Some are well versed in the manufacturing of paints and enamels, but what does a paint shop foreman care what the material is made of, so long as it has the qualities he is looking for?

I have met salesmen who insisted on selling a high-grade, slow-drying varnish where conditions in the paint shop did not permit its use. It is seldom that a salesman takes shop conditions into consideration and, as a result, he often sells the wrong material, causing a lot of lost time and money, and making the shop foreman or production manager denounce his whole line of goods. This would never happen if paint and varnish concerns would pay more attention to the need of competent technical men to go out and meet the trade.

### A Salesman's Blunder

To illustrate certain typical blunders that some salesmen make, I will relate a few incidents I have witnessed. We were in need of a high-temperature baking enamel. The salesman brought two sample cans to the chief engineer; one can was marked rubber finish, the other baking enamel.

The salesman left the following instructions: "Apply first coat baking enamel; second and succeeding coat, rubber finish." The minute I opened the cans I knew that he switched the first for the second coat, but the chief engineer insisted on having the order followed, consequently the job turned out to be unsatisfactory.

On another occasion a black, air-drying, finishing varnish was recommended for use under the black rubbing coat. If a salesman of this type did business directly with a foreman, he would soon lose out, because the foreman could not

have any confidence in his goods. The foreman would feel that the saleman's main object was to sell, regardless of the adaptability of his materials.

Large plants today are under the direction of chief engineers. Some of these men, in order to conceal their ignorance about painting problems, prefer to seek information from a paint manufacturing concern rather than put their problem up to the finishing shop foreman.

I will say that some paint and varnish manufacturers have very competent men in the field, but their numbers are few. Painting problems have reached such a state today that plant engineers feel their problems should be taken care of by paint manufacturers.

### Problems Demand Service

Paint manufacturers cannot always supply the demand promptly; often certain problems are left with salesmen to solve, with results that are seldom satisfactory. Service departments are maintained in practically every branch of industry; in fact, it has been found that the man giving 100 percent service is the man that will increase sales.

Paint manufacturers have made a tremendous leap forward in the improvement of lacquers and it is important for them to have competent technical men in the field—men capable of intelligently introducing this material, and having enough shop experience to recommend the right kind of material for varying shop conditions. If the representative's suggestion is right in the beginning, he will always be welcome.

I hope that more salesmen will consider the application of finishes as a more serious problem than merely brush swinging, and learn something about actual shop practice; then they will learn how to increase business. It is only through intelligent and practical instruction that a salesman can hope to learn what he should know about the actual application of finishes and the results of same under various shop conditions.

### Wasted Time and Effort

I believe that 95 percent of the time wasted today is the result of wrong materials shipped to users of finishes. Personally, I cannot see why it is necessary to waste such an enormous amount of time to give users of finishes the right kind of material.

It is evident that buying and selling transactions, as handled between the average purchasing agent and salesmen, are seldom satisfactory. In the first place, a paint-shop foreman usually speaks in his own technical terms which, in turn, a purchasing agent may not grasp properly; consequently by the time the purchasing agent explains the company's needs to the salesman, and the salesman in turn to his house, the material on order may be anything but what the paintshop foreman wanted. Consequently this material is shipped back again with a whole lot of explanation—with results that are seldom satisfactory to either party.

Often we find the same trouble if a shop foreman deals directly with some salesman. There are some salesmen who go no farther than acquainting themselves with stock goods, and then only on paper. Such a man may be able to recommend some leading stock brands used successfully in other shops, disregarding shop conditions and perhaps sacrificing the reputation of his goods.

**The Technical Approach**

A practical technical man, however, will study shop conditions carefully; he may spend a day or two in the shop to acquaint himself thoroughly with our needs. Consequently, he gives us a material that will suit perfectly. In most cases the business will be transacted in the shortest possible time; we get the material we want—proper shade and color, right drying or baking, etc. We waste no time experimenting, consequently we cut down our overhead expenses and we are ready for production.

We all expect a 100 percent service and we should get at least 75 percent of it if we insist on it. Probably we have to help pay for such service, but who is not willing to pay for efficient service when he can save money (represented by time and production) that otherwise would be wasted?

It would be interesting to see the amount of unsuitable paints, varnishes, and enamels some paint-shop stock rooms contain—material that eventually will reach the dump. Why? There should be an answer. I would be very glad to hear from other readers of this magazine on this subject.

*Comment by Editor:* The selling, demonstrating and servicing of industrial finishing materials; the selection, testing, and purchase of these materials; and the attitude, knowledge and ability of salesmen, technical men, purchasing agents, superintendents, finishing foremen and other interested individuals—these elements have been discussed from several different angles by a number of writers whose articles have appeared in INDUSTRIAL FINISHING during the past year.

It is evident, from the opinions and information submitted that wasted efforts and dissatisfaction do characterize a number of transactions between concerns who sell and those who buy industrial finishes. Of course, we all know that at the same time, numerous contacts established between representatives of sellers and buyers, and many transactions resulting therefrom, have been and continue to be highly satisfactory in every respect. What we seek now, is to find out why all such contacts established, and all such transactions entered into, are not 100 percent satisfactory.

Recently an industrial finishing salesman of our acquaintance—an experienced salesman who is acknowledged by his acquaintances and associates in the industry as being a real "live wire" and "result-getter," declared himself very much in favor of a practice which offers, so it would seem, a practical and logical remedy for much of the wasted effort and dissatisfaction that characterizes some transactions in finishing materials—especially where new contacts are established and where new materials are introduced.

This salesman, pointing out the scarcity of high-grade men who are effective both as front office salesmen and practical demonstrators in the shop, contends that finish manufacturers, instead of assigning one man to cover the specific territory, should put on two men to work together. One man would be essentially a salesman of high order, while the other—the salesman's "Man Friday"—would be a practical man serving essentially in the capacity of demonstrator, service man and trouble expert. Here, our friend tells us, is an ideal combination—provided, of course, each man is properly qualified in his own sphere of activities.

On the basis of this combination, the salesman is the type of individual who can meet company officials on common ground and, by sheer force of personality, convince the individual in authority that he (the salesman) has something worth consideration; then he arranges for an investigation of the company's finishing problems or requirements, or for a demonstration or trial order if conditions justify or permit it.

Once this permission is granted, "Man Friday" enters the picture, meets the foreman finisher on common ground, gains his friendship and confidence, and then proceeds without opposition to put across his part of the program so smoothly, so efficiently, and so economically that he wins instant admiration and confidence for his firm, his firm's goods and his firm's representatives.

By this plan, suitable materials are submitted for the job and they are applied properly to insure satisfactory results. The material submitted is given a fair trial under favorable conditions and, what is of greatest importance, both the front office and the finishing department personnel are convincingly sold on it—provided, of course, it meets all the requirements. As a result, the handicap that many new finishing materials face is entirely removed.

A plan of this kind, assuring as it does high-grade, front-office salesmanship supplemented by a practical man's contact with the foreman finisher; expert investigation of the prospective customer's conditions, problems and requirements; wise selection of suitable materials; correct and effective demonstration; practical instruction and follow-up services if necessary—this apparently would serve to close up transactions more rapidly, more effectively, more economically and with greater satisfaction to all concerned. It would cost more to begin with but, in the final analysis of volume business and net profits, wouldn't it, like wise advert'sing, more than pay for itself?

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## Paint and Enamel

The chief distinction between paint and varnish is that paint contains in suspension an appreciable amount of insoluble material known as pigment. The liquid portion or vehicle of paint may be composed almost entirely of varnishes, in which case it is usually referred to as an enamel or color varnish.

Paint is the general term for all protective coatings containing pigments. An enamel is a special type of paint made from varnishes. General usage, therefore, has made it common to refer to paint as a a pigmented protective coating the vehicle of which is largely composed of oils rather than varnishes.

To put this into the form of a definition, paint is a liquid or semi-liquid mixture composed of opaque or semi-opaque substances suspended in a liquid, which forms an adherent protective or decorative coating when spread in a thin film on wood, metal or other surfaces.—P. J. Marvington.

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Flake, or silver grain, are the rays in oak and sycamore which give the wood a "flaked" appearance when quarter-sawed.

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### *Pylam Products Stores*

Pylam Products Co., announces that stocks of their colors are carried by the Wilbur-Ellis Co., 655 So. Anderson St., Los Angeles, Calif., and by the American Lacquer Co., 1127 West 6th St., and 1126 West Sloo St., Cincinnati, Ohio.

# Modern Airplane Finishing

***Pointing out the remarkable progress of aviation, revealing the characteristics of modern airplane construction and calling attention to a new finish developed for all-metal aircraft.***

**By M. C. Roberts**

AVIATION, as an industry, has shown rapid development throughout the country recently but there are few people who realize the extent of its magnitude. The industry is very active; there are upward of 30 manufacturers of aircraft whose products are nationally known, yet orders for airplanes have practically outrun the capacity of these establishments. Twenty-four years ago the thought of flying through the air was considered a thought born in the mind of a fanatic, today it is very much of a reality.

The country is becoming air-minded and very few well-informed people question the feasibility of air transportation. The trend toward the furtherance of aviation is largely responsible for the fact that business corporations—whose activities cover large territories—as well as express and transportation companies are the best customers for airplanes, instead of it being, as is sometimes assumed, a purely sporting proposition.

### Modern Aircraft Construction

A composite description of ten well known airplanes is covered in the following general specification;

Fuselage—Wood and plywood construction with chrome molybdenum steel tubing.

Seating capacity—2 to 12.

Freight capacity—500 to 1000-lbs.

Speed—110 to 150 miles per hour.

Fuel—50 to 130 gallons.

Cruising radius—500 to 1000 miles.

Conveniences — Non-shatterable glass windows, heat, ventilation, leather cushions, easy reclining chairs, card tables, lavatories, reading lights and electric cigar lighters. These features are found mostly in the larger monoplane type of aircraft.

### Aviation Grows in Popularity

Some of the better established airplane manufacturers have foreseen the present trend of aviation, and it is such manufacturers that are partially responsible for the place that aviation will soon take among the great industries of America. Aviation is undoubtedly here to stay. The airplane industry itself is entirely new, but it shows possibilities of placing

second to the motor car industry within the next five years.

In the development of the present day aircraft, great strides have been made and it is reasonable to assume that the end is not yet in sight.

There is no doubt but that the mode of travel of the future will be through the air; we may look forward to the reality of aircraft of enormous size being driven at great speeds.

### Protective Coating

From the standpoint of developing a protective coating for aircraft, we find that we are confronted with a problem. The present type of aircraft is usually of the following structure; Wing and fuselage network of wood, with a protective covering of fabric; chassis of steel tubing.

Several types of all-metal aircraft were developed—purely as an experiment—less than two years ago. These planes are in daily use and have proved the practicability of their construction by continued service.

### All-Metal Airplanes

It is a well known fact that wood and cloth rot, whereas metal, when properly protected, will last indefinitely. When some of the experimental all-metal aircraft was first put into use, it was assumed that the life of the craft would be about 100 flying hours. Today some of these airplanes have exceeded 3000 flying hours and show no sign of deterioration.

Most of the metallic compositions used in the construction of all-metal aircraft have a pronounced attraction for moisture, therefore it is essential that the metal be protected so as to reduce its tendency toward absorption of moisture which would hasten the corrosion of the metal.

### New Metal Finish Developed

In the writer's opinion the probable future type of aircraft will likely be of all-metal construction.

After careful study, which resulted in a survey of the aircraft industry, there has been developed a product of true nitrocellulose composition that can be safely recommended for all-metal aircraft. This product will contract and expand with the metallic surface. The method of application is by spraying, which thoroughly atomizes the material in the nozzle head of the spray gun before it is forced as a wet coating onto the work.

The nature of the product is such that when the proper spraying body is reached, a smooth and even coating of material results, producing a mirror-like finish. The wide variety of color range of present day motor cars can also be extended to aircraft. Color means everything and color commands; it is the selling feature (appearance) of the products.

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Today it is not desirable for a manufacturer to carry large stocks, and it is essential that rapid production methods be employed.

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### *Great Lakes Plating Co., Expands*

The Great Lakes Plating and Japanning Co., Chicago Ill., has purchased a large factory building at 1715 Dickson St., comprising 50,000 square feet of floor space. This building will be used exclusively for the finishing of metal and wood.

This company, ranking as one of the largest job production platers and japanners in the U. S., specializes on chromium, udylite, gold, silver, nickel, copper and brass plating and finishing, most of this work being done mechanically.

# Modern Methods Applied to Finishing Wood Beds

***Calling attention particularly to the portable racks and means for supporting side rails, posts and ends of beds during the finishing process—as employed in one modern factory***

**By Donald A. Hampson**

IN A factory where wood beds are made in quantities, the methods employed for handling, spraying, drying and racking the parts in process are of considerable interest. Beds of this kind are in the knock-down class, which makes it easier to handle the several sections through the finishing process. At that, the sections are reasonably bulky or lengthy. Beds are dissected into "ends"—the head end and the foot end,—side rails and posts. The ends of a day bed are alike, but those of other beds are different, the taller end being at the head.

The side rails of a bed frame are made of veneered or solid pieces. The outside face is the important one, and advantage is taken of this fact to place the other side down when finishing. The drawing, Fig. 1, shows a drying rack that is used to hold a load of sprayed side rails. This drawing is not made to scale, the idea being to emphasize important details rather than proportions.

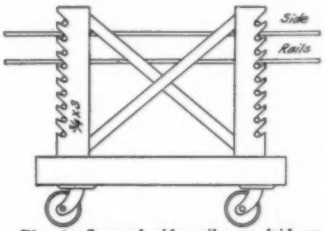


Fig. 1—Sprayed side rails are laid on cross rods which are supported by notched uprights.

Notches in the outside edges of the uprights receive round cross bars as shown. These rods may be either iron or short sections of wood dowel stock. A double row of bed rails is placed on each pair of rods. Resting on the point of tangency only, there is practically no contact between the under side of the side rail and the round rod, to affect what finish is put on this side. The face side of each rail is up, so that nothing touches it.

Depending somewhat on the grade of bed, the finishing process begins with a dip in a stain tank, after which the important faces are filled by brushing. When the parts come to the first spray booth they have been sanded and are ready for a coat of rubbing varnish. Drying on the racks follows, after which one or two more coats of varnish are usually applied.

Posts go through an equal number of operations. It is possible to practically finish a post before assembling the bed. Day beds have short posts compared to those used in four-posters and canopy-top beds. The longer posts are made in two pieces and joined by heavy dowels in the final assembly.

The sketch in Fig. 2 shows part of a truck on which these posts are racked in upright position, making use of the dowel hole. Trucks, having a series of short

dowels projecting vertically from the truck beds, are used for this work. These are the regular dowels 1-in. in diameter; they are sanded down a little so that the bored posts will slip over them readily. As fast as the sprayer coats the posts, his helper racks them on the dowels and, when a load is made up, the helper pushes

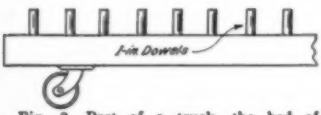


Fig. 2—Part of a truck, the bed of which contains short projecting dowels. The bored ends of sectional posts are set over these dowels and the posts remain upright while the finish dries.

the truck into the drying room. The dowels are properly spaced to hold the posts clear of each other, but at the same time insure the placing of a maximum quantity in a given space.

Long one-piece posts that have no dowel holes in the ends must be supported differently. Each truck for these is made with a wire grille placed in level position 3-ft. above the truck bed. The sprayed posts are set on pins, or in slight depressions in the bed of the truck, to hold them at the bottom, and the grille opening serves to steady them about half way up.

For assembled bed ends, the spray booths are equipped with ceiling hooks of steel. These same

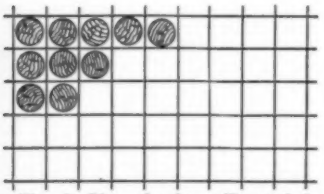

Fig. 3—Plan of wire grille used in connection with a truck to hold solid one-piece posts in upright position while the sprayed finish dries.

ends are stored along aisles and kept properly spaced by dowels projecting from a 1x4-in. strip which extends lengthwise between two aisles. This arrangement is extremely simple but very convenient.

Compressed air is used for cleaning the wood surfaces in the white, for spraying on the finish and for driving the rubbing machines.

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## Refinishing Furniture, Fixtures and Woodwork

Interior finishers and also furniture finishers in factories and refinishers' shops, have been faced with the problem of attempting to eradicate aniline dye, such as mahogany, from wood surfaces in order to prepare them for safe application of enamel or paint. This is not at all unusual, either with the home owner who desires to brighten up the old dark finish, or with the owner of a business block or apartment who may be compelled to renovate and redecorate the suites or offices.

It is, in fact, a difficult thing to do, and at best always carries with it some uncertainty as to how long the remedy will be effective. The writer has been told by others that in some cases they could not hold back the dye on work, even when they removed the old finish down to the bare wood, applied pure shellac and then a coat of aluminum paint. The dye eventually worked out and discolored the finished job.

It has also been advised to apply a wash coat of benzine or gasoline, after all of the finish has been removed with varnish remover. In this connection, the operator is cautioned to carefully remove the old finish from all grooves and crevices with a picking brush,

and from the under edges of tops, seats or any parts where it may have overlapped. Otherwise, subsequent brushing will likely carry the old stain up and into the cleaned surface.

Thoroughness in work of this kind is a large factor toward successful results, and this means that the finisher should be just as particular to prepare obscure surfaces and crevices originally stained, as he would be to treat the faces or exposed portions of the job. The naphtha wash recommended supposedly neutralizes or sets the color of any stain which may yet remain in the wood, and thereby prevents its working through the shellac and aluminum coats.

However, the writer places greater reliance on an entirely different material which so far has proved effectual in very stubborn cases. Dissolve one pound of casein into three quarts of water, to which has been added four fluid ounces (1/32 gallon) of aqua ammonia. This will produce about one gallon of solution, which may be strained free of any insoluble particles suspended or floating on top.

Apply this to the work previously cleaned as completely as possible, as recommended in the forepart of this article, avoiding unnecessary brushing which might drag particles of dye out of the pores. On this account spraying is advised, where such equipment is available and can be utilized.

If sanding is necessary, this should be done very lightly to remove only the coarse nibs. It is preferable to avoid any sanding of the first coat and only sand the second coat lightly to smooth the surface and eliminate any imperfections that might show in the final finishing. Obviously, care must be exercised to avoid cutting through the first sealer coat. From this point, the work can proceed with either enamel or lacquer.—A. N. Rofilac.

## How Much? How Good?

We see now that "cost" is not necessarily measured in terms of money given for a thing, but rather in the degree in which the product satisfactorily fills our requirements. The question less frequently is, How much is it? More important is: Will it do the job?

Does all this mean that the menace of pure price competition is fading? We think so. Not that it will ever disappear—a certain amount of price competition is healthy, if not really essential—but the day when price was the sole deciding factor in the purchase of equipment or materials of any kind has passed; and all of us, buyers and sellers, are better off for its passing.—The Bulls-Eye.

Fabric, coated and not coated, is used extensively on European-built automobile bodies.

### *Berry Brothers Distributes Air Map*

Berry Brothers, Inc., Detroit, Mich., has recently issued a map showing all air mail lines in the United States. A limited supply of these maps is available, but requests for copies will be supplied while they last.

### *Richard Zeller Joins Walker Co.*

The Henry V. Walker Co. (17 John St., New York City) announces the addition to its staff of Mr. Richard Zeller, who has assumed the duties of Works Manager of its Elizabeth, N. J. plant. Mr. Zeller has had 17 years experience in the lacquer industry. He will direct and supervise the manufacture of the complete and varied line of lacquers, enamels and pyroxylin products manufactured by the Henry V. Walker Co.

# Lacquer Finishing Small Articles By The Tumbling Process

***Finishing engineer with James B. Day Co., calls attention to the possibilities of finishing small wood turnings and similar articles in lacquer by the tumbling process and describes in detail the various steps involved in a typical lacquer tumbling job.***

By W. W. Bennett

MANUFACTURERS who have tried tumbling lacquer for small parts and turnings report substantial savings in finishing costs. This is especially important under present marketing conditions, where so large a proportion of many diversified lines is under the handicap of severe price competition.

Tumbling lacquers provide a finish of real attractiveness at the very minumun cost of application and, in the case of kitchen utensils or other articles on which only the handle or some small part is finished, this finish often adds materially to the attractiveness that produces extra sales.

### Low Cost Application

Tumbling lacquers have cut costs from several angles. The large number of parts which may be finished in one operation reduces handling costs materially. In the tumbling process, the number of pieces handled in one operation is only limited by the size of the tumbling barrel, or whatever apparatus is employed.

Small parts or turnings may be handled and finished in large quantities at a time, with a considerable saving at each step in the procedure. The number of coats necessary for a good tumbled finish is usually less than that required for a finish of corresponding excellence secured by any other method of finishing.

### A Recent Development

Tumbling lacquers that give satisfactory results, represent a very recent development in fin-

A few handles and turnings finished by the tumbling process.

ishing small articles. Until a short time ago, it was generally believed that lacquers would not work successfully by this process. Now, however, lacquers have added to the tumbling process, the effectiveness that has made them so universally popular in other classes of finishing.

Every feature that makes lacquers appeal to the owner of a fine motor car or a fine suite of furniture has been made available for use on small turnings or parts. Lacquer adds materially to the attractiveness and durability of toys, tools or utensils with handles, and scores of other types of finished articles.

In the past, a cheap finish on the class of goods which lends itself to tumbling has usually been a poor finish. Now, however, articles finished with tumbling lacquer are unusually attractive. It is possible to give even the lowest priced articles a smooth, glossy finish that is fresh-looking, bright and attractive. Tumbled articles may be successfully finished in any color of lacquer enamel, in mahogany or walnut finishes, or in a clear transparent finish.

### Durability of Finish

It is simply impossible to mark a tumbled finish by the well known "thumbnail test." Small wooden handles finished by this process have been subjected to a heat of 300-deg. F. for two hours, with absolutely no effect. Others have been put in boiling water without injury. Needless to say, these tests are far more severe than any to be encountered in practical use.

One of the chief economies obtained by the use of tumbling finishes is in the elimination of forced drying. Articles finished with these materials may be entirely finished and ready for shipment in two hours. When you consider the wide variety of finishes obtainable in tumbling lacquers, this is a remarkable record. No ovens or special drying apparatus are necessary. The lacquers air dry in this time, and an operator of little experience has no trouble in securing this result uniformly in every batch.

### Non-Poisonous

A point of especial importance to the toy trade is that tumbling lacquers are non-poisonous. The larger lacquer manufacturers at least will guarantee their materials to be non-injurious, and such a guarantee should be required by any toy manufacturer for whom this point is important. Small articles, which children are likely to put into their mouths, must be perfectly safe.

Tumbling lacquers of good grade will not check, crack or peel, and are unaffected by moisture.

### Typical Tumbling Process

Small "beads" and similar turnings may be tumbled in an ordinary round barrel. A discarded barrel which has been used for some other purpose is usually well adapted for tumbling small parts —provided it is in good condition. For finishing larger parts special barrels are necessary, but these may be made easily and at low cost.* A separate barrel should be used for each color.

Each barrel should be equipped with two doors, one solid and the other fitted with wire screening, with the mesh smaller than the smallest turning to be finished. The barrels should be about half full of the turnings, and they

*Regular tumbling barrels can be purchased.

should be made to revolve with the screen door in place before any finishing material is added. When all dust has been sifted out, the tumbling lacquer may be added a small quantity at a time and the barrel revolved between each additional application until the lacquer is used up.

### Details of Procedure

The barrel should be revolved long enough to distribute the material evenly over the turnings, but not long enough to become dry. This process should be repeated until there has been enough material added to completely coat the turnings. The reason for adding the tumbling lacquer in small quantities is to prevent getting too much on the turning, which would cause it to pile up and make a rough finish. While the tumbling lacquer is being used, the solid door should be in place.

When enough lacquer has been added to completely coat the turnings, the barrel should be made to revolve with the solid door in place until there is no moisture left in the barrel. Then replace the solid door with the screen door again. This screen door should be left in place as the barrel revolves for a few minutes—just long enough to allow the air to harden this coat.

### Polishing Process

The turnings are now ready for polishing, and the solid door should be put back in place. The tumbling polish should be added in small amounts at a time, the quantity depending upon the number of turnings the barrel contains. For the ordinary size barrel, about ¼-pint of tumbling polish is enough to add at one time.

If too much polish is added, it will soften the first coat. The time allowed between applications should be only enough to dry the turnings; that is, there should be no more polish added until the preceding application is dry. This operation should be continued until the desired gloss is obtained.

The entire finishing operation may be completed, with the turnings dry and ready for use or shipment within two hours.

---

## Open Windows Near Spray Booth? No!

It seems to me that there should be no windows that can be opened near the front of the spray booth —if the operator expects to turn out good work. Of course, there may be grades and classes of work done in sprayed finishes, where you can have the window up, but for the majority of us to put on good finishes, we don't need any outside air coming in. There is enough of a fight against dust, moisture and impurities in the air near the booth, without adding any to them by opening the windows.— Platt.

---

In the installation of the compressor unit and the connecting air line, one must give thought to the precipitation of moisture.

---

### *DuPont to Handle Glyptal Resins*

A license agreement has been arranged between the DuPont Co., and the General Electric Co., whereby the DuPont Co., is given certain exclusive rights to the use of Glyptal resins in the metal, natural wood furniture and automotive field, and certain non-exclusive rights in other fields.

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# Color Decoration by The Screen Stencil Process

*Last installment of a two-part article which tells how to design, make and use the new screen stencils for applying single and multiple color decorations on furniture and other articles*

By C. F. Merrifield

ANOTHER process, known as the "Select-a-scene" process, can be employed which permits one piece of silk to be used to make the screen for all colors. This method differs from what was described in last month's article in that the entire design is traced onto the silk at one time and, after each color has been run, only those parts of the design which are to show in the finished work are blocked out. This makes it possible to get an absolute register and it conserves silk. However, an experienced man is needed to properly block out the screen after each color run. As the additional colors are run, one color is laid on top of another and the screen becomes more and more blocked out, until finally only the finest details of the design which are to be run in one color, are left open in the screen.

Such a screen cannot be used over again for repeat runs, but must be made new each time a run of the design is made. For that reason, separate screens for each color are used for decorating furniture, or whenever it is desired to repeat the design several times with a considerable interval between runs.

Instead of using a blocking-out liquid, as has been described, one-color screens are sometimes blocked out by a photographic process which consists of sensitizing the silk and exposing it to the light in contact with a negative of the design to be produced. The sensitized and exposed screen is then washed with chemicals, which permit the unexposed portions of the silk to be washed free of the sensitizing material, so as to leave the mesh of the silk open again. At the same time the exposed portion of the screen is "fixed" with other chemicals, so the coating becomes insoluble in the solvents used in the paste color. This process is not used as extensively as the hand blocking-out method, because of increased cost.

### Using the Stencil Screen

Either the organdy, cut-out stencil screen, or the silk blocked-out screen, is used in the same way. The screen is placed against the surface to which the design is to be transferred, and a small quantity of paste color of the proper shade is placed on the blocked-out portion of the screen. A hard rubber squeegee with sharp edges is placed in this paste color and drawn across the open portion of the screen. This pressure forces the color through the mesh of the organdy or silk which is not blocked out by the paper, shellac, lacquer or other stopping-out material, and allows the design to be reproduced on the surface under the screen. The screen is then raised, a fresh surface is placed under it and the

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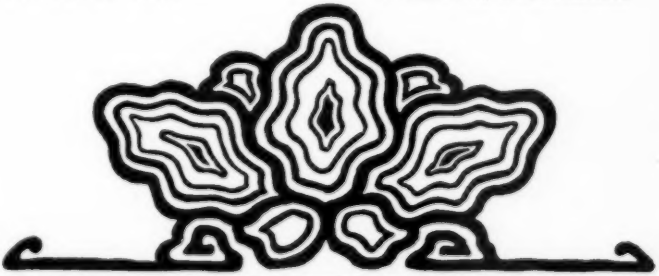

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squeegee is drawn across the open part of the screen again. This is repeated over and over again until the desired number of impressions has been made.

The paste color, which has been transferred to the work, should be allowed to stand until dry before a second color is laid over it. Usually, only one color is run each day, except on tire covers and similar work where the colors can be force dried in an oven, and the drying time greatly diminished.

### Applying Added Colors

When the second color is ready to be laid, the proper screen should be selected and the work adjusted under the second color screen until the new portion of the design fits exactly into the place it is supposed to occupy in the finished work. Then the second color can be applied the same as the first color. After it is dry, the third color screen can be registered and the third color run, and so on until all of the colors have been run.

### Cleaning the Stencil

When the run is complete, or if the open part of the screen becomes clogged with paste color in any way, the screen is washed free of color with gasoline or naphtha. The blocking-out material, being insoluble in such materials, is not affected by the washing. When the screen is dry, it can be used again. Screens, blocked out with lacquer or shellac, can be completely cleaned with lacquer reducer when the screen has served its purpose; then the silk can be used again for another design.

### Selection of Designs

In selecting designs to be reproduced by the silk screen process, keep in mind that they should be executed in the poster style, with each color forming a clean-cut dividing line where it meets another color. No blending or shading of one color into another can be successfully done by this process. For the same reason, the design should be more or less bold and as simple as possible for the purpose in mind. This makes the screen-making an easier job and insures clean-cut results.

Experts at screen making, however, can duplicate almost any design, so long as it is of the poster style, no matter how intricate it may be nor how many colors may be used. As high as 12 or 15 colors are somtimes run on very intricate designs, but the average design probably calls for no more than three to five colors. Where a large number of colors are used, it is almost necessary to use the "Select-a-scene" process to insure perfect registration of the various colors.

Although ordinary paste colors ground in oil, or paste colors ground in japan, are sometimes used for screen work, they do not have the proper working qualities and soon fill up the mesh of the screen; they do not dry fast enough, are too brittle when dry, or otherwise do not give the best results. It is better to use special paste colors, made expressly for silk screen work.

---

## Salvaging Spray Dust

The waste in the form of spray dust can be dissolved with a lacquer thinner and used again. The writer has used material of this nature on unimportant parts with fair results. Care must be taken, however, in screening the waste so as to remove all dirt particles; one must avoid saving any material that has come in contact with the greased fans or walls.

The writer is really skeptical

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# 2 THINGS

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about the practical success of this saving. In the first place, a lacquer thinner costs almost as much as a cheap lacquer and you surely have no better than a cheap lacquer, when you make a lacquer of salvaged spray dust recovered from spray booths.

It is a well known fact that lacquers must be well balanced in order to give durable results. How can a lacquer of this nature be a well balanced lacquer? At any rate, I will have to make more extensive tests before making this operation permanent in my finishing room. Some say, use it as an undercoat. Undercoats, in my estimation, are the most important part of the finish.—E. B. Smethers.

## Finishes at Radio Show in San Francisco

At San Francisco's recent Radio Show, it is interesting to note—and reasonable to assume considering its advancement—that lacquer finishes predominate as a coating medium. The radio cabinets finished in lacquer were very pleasing. Oak and mahogany—as can be expected—constituted the greater portion of the cabinets.

A few cases were constructed of maple and a few of walnut. The very pleasing panel effects of the latter must be commented on. Quite a few cases were finished in a high luster clear wood lacquer and a number in flat wood lacquers, comparable in appearance to a rubbed varnish sheen. Most of these cases were high-lighted with a corresponding stain lacquer and they commanded considerable attention.

The metal radio cases were, in most respects, finished in "wrinkle finish." Over this wrinkle finish was sprayed an aluminum, gold or chocolate bronze powder lacquer. Several metal cases appeared in colored lacquers. The predominating colors were Chinese red and green. These cases were hand decorated. Radio cases finished in colored lacquer appear to be more or less of a fad, and I am inclined to believe their popularity will be short lived.—M C. Roberts.

---

The "why" of the present galaxy of colors one sees in every display window is readily apparent. Manufacturers are taking the human education into consideration more and more, and putting, as a final appeal, the most attractive and pleasing finish possible to their products—whether it be a gas range or a tooth-brush handle.

---

### Naz-Dar Co., Moves

The Naz-Dar Co., of Chicago, manufacturer of silk-screen-process paints, equipment and supplies for quantity printing in oil colors, announces that "on August 20, we will move to our new building at 4014-22 N. Rockwell St., just north of Irving Park Blvd. No change in telephone numbers, Keystone 8600."

### *New Container Booklet*

The Geuder, Paeschke & Frey Co., Milwaukee, Wisc., has just issued a new 24-page booklet treating container problems and their solution. Complete descriptive literature, including facts about maximum shipping safety and convenience in storing and using containers for liquids, pastes and powders, is revealed in the new catalog of this company's products.

### *Index of Published Information*

The Policyholders' Service Bureau of the Metropolitan Life Insurance Co., (New York City) is sending out a 32-page booklet listing publications which it has prepared for manufacturers and business men in general. The reports and booklets listed are available to all business executives interested in the subjects considered.

## *Announcing a complete line of semi and fully automatic graining and coating machines*

THE above photograph is of our Type "A" Machine, which eliminates the use of plates, materially cuts costs of labor and greatly improves results.

We have on display for demonstration a complete new line of machines and equipment for the reproduction of wood grain, marble, etc. and the application of clear and colored coatings at our Dayton laboratory.

By the use of these new devices, labor and material costs have been greatly reduced in many lines of production, and above all, quality and uniformity have been so improved as to call forth the commendations of both the largest and smallest user not only in the United States, but in Europe and throughout the world.

# OXFORD VARNISH CORP.

**DETROIT, MICH.**

*"Here is an article dealing with the first principles in mixing and matching water stains, mahogany wood being considered. If this article meets your approval, I will submit another dealing with oak or walnut."—F. W. Purdon.*

# Mixing and Matching Water Stains for Wood Finishing

***Superintendent of finishing in a large furniture factory, points out the importance of knowing how to mix stains, and explains in detail a series of experiments by which the finisher can develop and obtain accurate and dependable information along this line***

**By F. W. Purdon**

THE FOLLOWING paragraph is an abstract from an article on stain mixing and wood staining. It is quite misleading to the uninformed man who is trying to advance in this art.

> A water stain is a transparent colored solution obtained from coloring substances which are soluble in water, and have no body, as walnut juices, log wood extract, tumerce, indigo, juices of berries and bark of trees and pigments such as raw and burnt sienna, Van Dyke brown and Prussian blue.

Much sympathy is felt for the man starting his career as a wood finisher, especially if he should, by chance, have thrust before him an article on wood finishing, such as the above mentioned paragraph was abstracted from; the article was supposed to contain authentic information on the subject of staining woods. A man reads the article carefully, thoroughly absorbs the instructions it contains, and what is the result?

He has been given a lot of ancient information which is worse than useless to him. How long would he last in the modern factory, if he should follow the teachings of an article of this kind?

There was a time, many years ago, when such ingredients were used—for want of something better to make wood stains of—but progress has changed this. Now we have the finest anilines, dyes and chemicals, from which the beautiful colors of today are produced.

### Information Hard to Get

I believe, without a doubt, that there is not another vocation wherein it is as difficult to obtain correct data as on the mixing of wood stains; for some reason, it has been guarded with jealous care. As a result, the man desiring to further his knowledge along this line is left in a cloud of mystery, and must depend on the few published articles on the subject of making stains, to furnish the nucleus of his education in this art. Therefore, information contained in articles dealing with this subject should be correct.

Much of the difficulty in collecting correct information on stain mixing is being overcome by such mediums as INDUSTRIAL FINISHING and by the broad-minded, modern finishers who are training under-

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studies, and who are ready and willing to help others; also by the large color manufacturers who give out correct information on this subject. It is the combined efforts of all these sources of information that has helped to create the many beautiful colors that are being produced today.

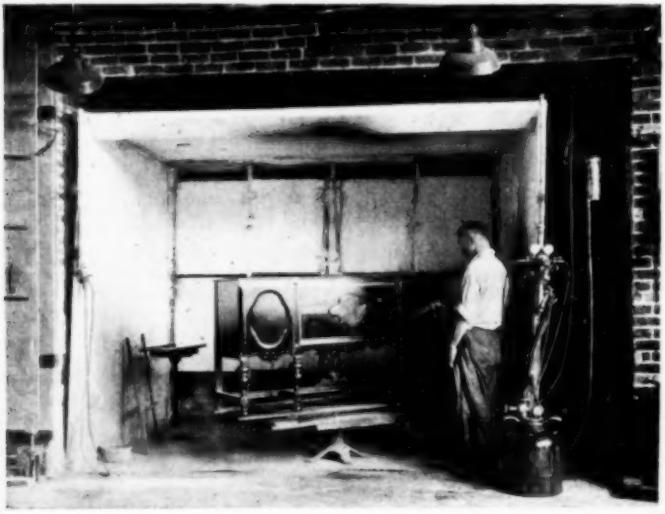
When many are seeking new facts on a subject, knowledge on that particular subject quickly comes to light; this brings progress and advancement to the industry on which this effort is centralized.

There are still many who are not versed in mixing stains, and it is for them that I am writing the following instructions.

### Custom Finishes in Demand

Good stains may be purchased, mixed in powder form, for all finishes that belong in the stain category, but it is rapidly becoming the custom for the purchaser of furniture to want his own color scheme followed out, and this, naturally, requires the matching of samples submitted. This is particularly true in the manufacture of office furniture, as most all the executive offices throughout the country require the very highest class of office furniture, and the finish on same must meet their requirements. The tendency today, in fitting out the large executive offices, is individuality in color scheme. So in this particular branch of wood finishing, there is no end of matching samples.

If the finisher, who is interested in this phase of finishing (mixing stains) and matching colors, will follow along the steps I am about to lay down, he may find some real help here—pro-



Where the final coats of lacquer finish are sprayed on case goods and table tops. This booth is housed in an offset projecting out from the building wall line. The booth can be shut off completely from the finishing room by releasing the automatic fire door, an edge of which shows at the extreme left.

*Wears Like Flint*

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Results that are uniformly superior coupled with low unit costs are responsible for the significant fact that many of our customers have depended on us for finishing materials for over twenty-five years.

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vided he has been born with an eye for color. Let the finisher first obtain a set of balances with weights, weighing grains, scruples, drams and ounces. In mixing stain it is absolutely important to be accurate in all weights, and I trust that the necessity of this will be fully undertsood.

First let us consider mahogany. From a good reliable stain house, purchase the following colors: nigrosine jet black, azo rubine extra, croceine orange Y. concentrated, acid yellow, acid green, and a good brown-base Swiss loutre or walnut crystals. For experimental purposes, one pound of each will be sufficient.

**What Experiments to Make**

Nigrosine jet black is in color what the name signifies, a jet black. Take one dram of this and dissolve it in one quart of hot water. For the accurate measurement of water, one should have a tested quart of graduated glass. Be sure that the nigrosine is thoroughly dissolved. Now on a small part of a mahogany panel, try this color and note the effect produced by it, then add one more dram of nigrosine jet. After this is dissolved, try another small part of the panel, and again note the results as obtained by the solution now containing two drams.

Next, let us take the azo rubine extra; this is the bright and strong red. Follow the same steps as you did with the nigrosine jet black. In this way you will gain a knowledge of the color produced by this stain on mahogany. Next, let us consider the qualities of croceine orange Y. Conc. Again I ask you to follow the same process as you did with the nigrosine jet and azo rubine extra, using one dram to the quart, then two drams.

I trust you will note particularly the tones produced by this stain, as many of the light shades of mahogany are produced with this stain alone—used at various strengths. It is also used as a base for the darker tones on mahogany.

Now follow along the same experimental routine with the acid yellow, acid green, Swiss loutre and the walnut crystals. If you have followed the steps properly you are now familiar with the coloring properties of the stains as used separately; then, from the proper combination of these, you may match practically every known color on mahogany. But to do this, you must know the correct proportions of each to use in making the stain.

Now take two drams of croceine orange Y. Conc., one dram of nigrosine jet black and dissolve these two colors in a quart of hot water. Try this stain on a mahogany panel; next add to this stain two scruples of acid yellow, try this stain and note the results in change of color. Next, add to this same stain two scruples of azo rubine extra Conc., and you will see that you have a much redder mahogany.

If you will make several such combinations of colors, using different proportions of the colors each time, you will see that there is hardly any limit to the shades and tones that you can produce. When you strike a color you like or one you are searching for, finish a small panel and on the back of it, or on a tag attached, write the formula so you will always have it at hand. Here is where you must be sure your weights have been correct, as the least variation in them will produce a different shade of stain when you use the same formula again.

# You Can *Identify* Berryloid without the label

**Those who have used Berryloid know it by its splendid working qualities, ease of application and almost total absence of orange peel. They can identify this material without the label.**

**Too, an experienced or discriminating eye quickly notes the difference between a well-applied finish of Berryloid and one of a lacquer not so well formulated. And as time goes on the difference is even more marked, for Berryloid actually improves with age—wear and abrasive action serving to heighten the luster.**

**Let our experts show you how well Berryloid will fit into your production plans. They will demonstrate its effectiveness on your products and will, in all probability, point out worth-while economies.**

**Remember this—sales problems can often be solved in the finishing room.**

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### Walnut Mahogany Colors

Next, let us consider the so-called walnut mahogany colors. First you must take into consideration the natural color or tint of the wood which ranges from a light pink to a near red. If you are going to create a walnut color on mahogany, it is necessary to take care of the reddish cast that is in the natural wood. It is impossible to remove this entirely and too expensive to even partially do it. You must change it into some other tint or, in other words, kill it.

Suppose you take one scruple of acid green and dissolve it in one quart hot water; try this stain on a mahogany panel. The result will be that the red of the mahogany changes into a greenish brown. Now by adding to this stain the right proportions of Swiss loutre, acid yellow and nigrosine jet black—and possibly a little orange yellow—you will be able to obtain a wide range of walnut colors on mahogany.

If you will follow these instructions carefully, make yourself acquainted with the coloring properties of each individual color as dissolved and then follow out a careful routine of experiments, in a very short time you will adapt yourself in being able to match any mahogany color which may come along. You will also have the knowledge of these colors to use in creating new color schemes for mahogany.

### Bichromate of Potash

Bichromate of potash is often used in mahogany stains. This comes in the form of a yellow or red-yellow crystal and should be ground fine to use, as this helps it to dissolve much faster. Bichromate of potash, dissolved in hot water and applied to a wood which does not contain tannin or tannic acid, such as whitewood, leaves just a yellow coloring. But when applied to mahogany, which contains a large percentage of tannin, it develops a deep brown tone that is controlled by the strength of the solution. It is used to give depth and permanency to the stain, as it acts on the tannic acid which is part of the wood itself. Therefore the stain also becomes part of the wood, and is real fast to light and permanent. Bichromate of potash may be used with the above colors and will improve the qualities of the stain.

### Other Finishing Operations

After you have matched a color, do not take it for granted that you are right until you have stained a panel and then sized, sanded and filled it, as these operations all exercise some influence in changing the color. Before you stain your regular run of work, make this test; then, when you are sure you are right, go ahead, remembering that haste makes waste. Take nothing for granted, only as the facts prove themselves to you.

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Manufacturers of the most utilitarian objects, for industrial purposes, are now designating various uses by colors. A pipe manufacturer, for instance, paints hot water pipe red, steam pipe white, gas pipe blue, etc.

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In this period of hand-to-mouth buying, when an order demands immediate delivery, mechanical finishing is the only solution to the custom shops.

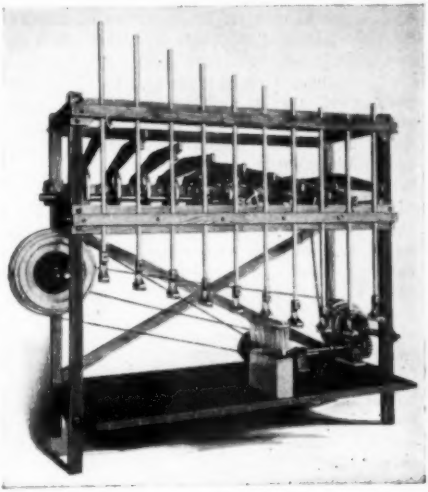
---

Gum elemi or elemi damar is a very light-colored gum which can be used in pale and colorless lacquers.

# Dip Finishing Pencils and Penholders

***Calling attention to specific changes that have taken place in pencil and penholder finishing, and describing hand dipping and machine dipping methods of modern lacquer-enamel finishing for these and similar articles***

**By R. L. Masterson**



A modern automatic dipping machine with ten vertical bars each of which can be used for lowering "blocks" of pencils, penholders, etc. into, and lifting them from, small containers of finishing material placed along the lower shelf. Cone pulleys and belt transmission permit of 12 different rates of speed.

THE FINISHING of pencils, penholders and similar small objects has grown into a business of considerable volume since appearance, as well as utility, counts for so much in pencils to-day. Formerly, pencils were made almost entirely of wood, and shellac was the principal finishing material used; but now pencils are made of metal, composition, paper and many other materials in addition to wood.

The advent of refillable pencils was accompanied by a decided preference for the pencil body to be finished in color, in addition to the natural cedar color which was formerly almost the universal finish.

Red cedar wood was once the favorite wood for pencils because of its attractive color, pleasant odor and easy sharpening properties. Now sap cedar, gum, maple and other woods are used, especially on the refillable, hollow tube type of pencils. Regardless of the type of wood used it should be well sanded to make it smooth and sliverless and, of course, it should be free of grease or other foreign material before any finishing operation begins.

Two methods of making wooden pencils, up to the point of finishing, are used. The older method calls for the pencils to be made in lengths of 3 or 4-ft. and finished by being pulled through a rubber gasket, after having been immersed in lacquer—a process very similar to that used by a majority of the broom handle manufacturers.

From two to twelve coats are

applied, depending upon the color and quality wanted in the final finish, and after all coats are dry the pencils are sawed to commercial lengths. This system gives a very good finish and represents some saving in labor cost through finishing several pencils at once and sawing them to proper length later, but it has the disadvantage of not leaving as heavy film on the surface, with one application, as is left by the newer method, consequently more coats are required to get the same degree of finish.

### Hand Dipping

The newer method—adaptable to all types of pencils—is to have the pencils net length before finishing them. Where production is not large, the pencils may be hand dipped, either singly or in racks which hold a number of the pencils at one time.

When dipping pencils singly, they are usually placed in an upright position to drain and dry on a screened frame, which allows the excess material to flow off without forming a puddle at the base of the pencil; or they can be fastened with pins or clamps before being dipped, and then hung up to drip and dry. In either case, if a clean drip is wanted, it is well to touch the bottom end of the pencil with a piece of paper or some similar material just after the finish quits dripping freely to "bleed off" the last drop.

By the "rack method" of hand dipping, the pencils are first fastened into a suitable rack which has needle points or something of a similar nature for holding the pencils in a firm, upright position. This rack, with the pencils in it, is dipped into a tank of lacquer and hung up to drip. Just as the lacquer quits dripping, the ends of the pencils are touched against another object to "bleed off" the last drop of lacquer from each tip.

### Machine Dipping

Where production is large, it is desirable to dip the racks of pencils by means of slow-immersion dipping machines—of which there are several designs obtainable. One of these machines can be regulated to coat as high as 100,000 pencils a day. Racks, capable of holding as high as 200 pencils at one time, are used with the machines, and these are so designed as to be easily loaded and unloaded.

Some of these automatic dipping machines are motor driven and have cam-operated arms which lower and raise "blocks of pencils" at a slow even speed, without vibration. Such a machine is shown in the accompanying illustration. Other machines are built on the hydraulic principle, depending upon the uniform flow of a liquid out of a closed cylinder to allow the pencils to be slowly and uniformly raised from the lacquer.

In all of these machines, the rack containing the pencils is lowered into the dip tank until the pencils are thoroughly covered. Then the pencils are lifted out at a uniform rate, which is usually adjusted to approximately equal the flow of the clear or colored lacquer, so there is no dripping after the pencils leave the lacquer.

In some special instances it may be advisable to withdraw the pencils half way then completely immerse them again and finally withdrew them entirely from the lacquer, to get the proper thickness of coating and the right flow of lacquer. Where the speed of withdrawal is a little too fast a stringy drop may form on the end

of the pencil, in which case it is sometimes the practice to "bleed off" this drop by touching it with a piece of paper or any other clean object. At other times the pencils are again immersed just over the tips and kept there for a moment for the lacquer in the dip tank to dissolve the strings from the ends of the pencils. Workmen in each factory usually find a little trick of their own to handle this problem.

Coating pencils by means of an automatic machine gives a uniform coating of greater thickness than by the hand method of dipping, or by the rubber gasket method. The lacquer can be used much heavier or more viscous in the dipping machines, consequently fewer coats are required to produce the desired finish. The machines are quite economical also, since they waste no lacquer through drippings.

### Finish Drying

After the pencils or penholders are coated, they are removed from the dipping machine and placed on a rack to dry, in the same relative position as they came from the dip tank. Draughts of air should be avoided during the dipping or drying process, and the temperature of the room should be such as to keep the humidity of the air sufficiently low to prevent lacquer blushing.

Some concerns find it advisable to place the freshly-coated pencils in slightly heated rooms to prevent blushing and to speed up the drying. If another coat is to be put on, this can be done within an hour or so after the first coat. When all of the coats are on, the pencils are usually allowed to dry overnight; then they are stamped, assembled and packed the following morning.

## Ivory Black

Much of the color sold as ivory black today is not a true ivory black. Ivory black should be made from the waste cuttings of ivory —the same way that bone black is made from bones.

These two blacks resemble each other, but to the trained eye, ivory black has a more brilliant hue than bone black.—C.D.Y.

---

### *Announces Withdrawal*

Mr. W. H. Gerke, of Indianapolis, announces his withdrawal from the recently proposed re-organization of the Elkhart Paint & Enamel Corp., of Elkhart, Indiana and states that he now has no connection or interest whatever in the above mentioned concern.

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# Finishing Different Woods

***Finisher of fixtures, interior woodwork and cabinets explains how he finishes several of the different woods used in this class of work.***

**By John A. Twamley**

IN THIS article I will submit some of my methcds in finishing different kinds of wood.

*Maple:* In finishing maple, first give it a coat of white shellac. One coat may answer, but sometimes two, three and even four coats are applied. Finish maple with a pale copal varnish, using as many coats as the work requires.

*Mahogany:* In finishing mahogany, be sure to use a paste filler and after this, give it a coat or two of shellac; rub each coat smooth with fine sandpaper. After this, apply two or three coats of varnish. If you stain it, do not use too dark a stain.

*Oak:* Use a paste filler here also. Oak is done in more different kinds of finish than any other wood. The principal finishes for oak are—light antique, natural, dark antique, golden in many shades, fumed, Flemish weathered in a great many different ways, Cathedral brown, Mission and Antwerp. But with all these, (and this is not a complete list) oak is never entirely hidden or disguised, for it still stands forth as oak. This cannot be said of any other wood used in finishing.

To make a golden oak the stain should be applied first, before the filler; use a thin stain and do not wipe it off. After this, apply the filler.

*Redwood:* In finishing redwood, also use a paste filler, which is to be rubbed into the grain and pores of the wood. Rub a little off after sanding. Then apply a thin coat of shellac, sandpaper and apply another coat of shellac. It is now ready for as many coats of varnish as may be desired —from two to five coats. The finish is a rubbed effect. The last coat of varnish is to be carefully rubbed with flour pumice stone and water, with a piece of felt for a rubbing pad.

This rubbing must not be done as soon as the varnish is dry, but at least two or three days should elapse, in order to allow the varnish sufficient time in which to get hard. In 24 hours after this rubbing it may be rubbed with powdered rottenstone and water; wash off and wipe dry with a piece of soft chamois. Then it may be rubbed with a little sweet oil on a rag, as this will brighten it up, but be sure to rub off all excess of oil. This will make a first class job. A cheap job may be done by simply shellacking the wood and applying one or two coats of copal varnish, rubbing the last coat with curled hair or moss to remove the gloss.

*Sycamore:* In finishing sycamore or buttonwood you will have the plain sawed and the quarter sawed wood with which to deal. The former is very nice but not as handsome as the latter. Finish this wood natural. Use a thin white shellac unless you stain the wood, in which case use the orange colored shellac. The finish may be with varnish, rubbed dull or left in the gloss. Usually light

## "Cheap" Lacquer isn't Cheap at all

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colored woods, maple for instance, appears to better advantage when done without luster finish.

*Pine:* Yellow or hard pine is often filled with liquid filler, but some pieces of it contain soft places, on which a paste filler must be used. This will fill the soft or open parts and the rest may be rubbed off. See that the surface is perfectly clean and free of marks of all kinds; then sandpaper it smooth, dust it off, and give it a coat of white shellac. Fill all nail holes and imperfections of all kinds with putty composed of white lead and whiting, with a little ochre in it to make its color correspond with that of the wood. Sandpaper lightly and give it a coat of shellac. Finish with good pale finishing varnish, slightly reduced with turpentine.

*Whitewood:* Whitewood, white pine and all similar light colored woods should be finished so as to preserve the natural appearance, except when it is stained. Oil darkens it, so the pale or white shellac must be used.

*Butternut:* Finish butternut (also known as white walnut) the same as you fill and finish ash and oak. Ash is filled with stiff paste filler the same as the oaks. The filler must not be colored.

*Cherry:* Cherry is usually stained with burnt sienna in oil, but the natural finish is sometimes preferred. Mahogany stain is good, for there are dark and light parts in this wood, and mahogany stain makes it all one color.

In the lounge compartment of an observation car on the Black Diamond, one of the Lehigh Valley's crack trains. Chairs are of American Walnut, attractively upholstered. Walnut is also used on the lower walls of the car, its richly finished grain effect being offset by linear designs in green and gold. The decorative effect is further heightened by cozy little side lights on bronze fixtures, set off with ivory colored shades.

## Adequate Lighting Facilities

When planning a finishing room, it is well to keep in mind the fact that a great deal of light is essential. At the same time the quality of light is important. Some finishing rooms have plenty of light, but of the wrong kind. Windows are placed above the line of vision, or made of corrugated glass. This has a depressing effect on workman. Confining the range of vision for a considerable length of time causes weary eyes and headaches. If occasionally, one can raise his head and look out over a long range for just a moment, a restful effect results.

The staining room, if possible, should be placed so the light comes from the north side. Light from this direction is much more uniform than from any of the other three sides of a building. Ideal light is essential in maintaining uniformity of stain shades.

A research department, set up by one large company, is responsible for much of the new business.

*Devoted to—*
*Questions*
*Answers*
*Suggestions*
*Comments and*
*Discussions on*
*Specific Problems*

# Questions and Answers

## Information Service

Every issue of *Industrial Finishing* contains a wealth of practical information on various subjects of interest to users of finishes and finishing equipment, but from time to time new problems and questions arise, which demand prompt and authentic information. *Industrial Finishing* is in position to service inquiries, and the editor invites all individuals and concerns in the industry to make known their wants. Every effort will be made to supply the information desired, at no cost to you.

Questions are invited in regard to:

Finishing-room troubles or problems;
Where to obtain certain materials, supplies or equipment;
What methods or materials to use for certain results.

Additional comments or suggestions regarding questions, answers or articles appearing in this section, are invited.

## *Ten Acres of Land!*

Somewhat of an idea of the vast size of our plant and our facilities for quantity production can be gleaned from the fact that *10 acres of land* together with *1¼ acres of floor space* are now required for the manufacture of raw materials and finished M. & W. LACQUER PRODUCTS.

We have absolute control of raw materials through our own Solvent Refining Equipment, and Cotton Nitration Plant. In addition we maintain an ever-watchful laboratory supervision.

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# Questions and Answers

***This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers***

## Dip Finish for Mop Handles

We would like to obtain information in regard to improving our present method of finishing mop handles, in colors. Under separate cover we are sending three of our handles finished in different ways and marked Nos. 1, 2 and 3. No. 1 is a two-coat job, finished for us by another concern and has a good gloss finish, though it is brittle and inclined to crack when we impress our name and trade mark with the steel die.

We do not know what this material is—whether it is a lacquer or varnish enamel—but we would like to get a finish equal to this, therefore we want to find out what the material is and where we might be able to procure it. The wood used in our handles is white or Pondosa pine, and as you will see from our No. 3 sample the wood absorbs a thin lacquer so that it becomes dull.

We want, if possible, to finish these handles in a one dip job, and believe we could do this if we could find some material which would be heavy enough, with a high gloss, and flexible enough so that we could impress our name, etc., before it set hard.—D. D. Co.

---

I have carefully examined the sample handles and am convinced that you have been misinformed concerning the finish on handle No. 1, which you wish to duplicate. The finish on this handle is lacquer but I feel certain that more than two coats were used, judging by the thickness of the film. There is a coat of clear gloss lacquer over the blue lacquer on this handle. At least two coats of very heavy blue lacquer must have been applied under the clear lacquer to get the thickness of film shown. In addition, it is quite possible that a tumbling filler was used on the bare wood to seal the wood before the first coat of blue lacquer was applied.

To duplicate the finish of handle No. 1 on white pine, I suggest you use a coat of tumbling lacquer primer,* which is applied by dipping the handles, in a wire basket, into the lacquer primer and then tumbling the handles in a tumbling barrel until they are dry. The primer must be used quite thin to get the best results. This coat will harden and seal the soft spots in the wood, and the tumbling action will smooth the wood and harden the surface.

After this priming coat has dried for one or two hours I suggest you apply a very heavy coat of blue lacquer, using a slow-motion dipping machine that will raise the handles out of the heavy lacquer mixture at a very slow and uniform rate. When this coat has dried for a few hours, then

*Name on request.

apply a second coat of the same material in the same manner. Let the handles dry overnight and dip on a coat of clear lacquer if a higher gloss is wanted. If the blue dipping lacquer has enough luster, the clear lacquer coat can be eliminated.—R. L. Masterson.

## To Do Striping Mechanically

We are making a bedroom suite on which considerable striping is used. The stripe is about $\frac{3}{16}$ to ¼-in. wide.

Will you please advise the best method of striping? We find that hand operations are slow and expensive. We are striping over filler.—S. W. Furn. Co.

We suggest you get in touch with the manufacturer of the striping device which is now being advertised in INDUSTRIAL FINISHING. We understand this concern's equipment is entirely satisfactory.

Another method of laying stripes, which we have seen in use, is to spray the material through a prepared sheet-metal stencil, the adjoining parts of the stencil being connected with inverted U-shaped staples set in upright position and soldered fast to the sheet-metal masking plates. This construction permits the spray of finish to pass under the connecting "links" which hold adjoining plates of the stencil in position.

Still another process, which might be adapted to your work, is the silk screen process, described in articles in June, July and August issues of INDUSTRIAL FINISHING and also advertised in current issues.— I. F.

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## Thinning Enamels and Varnishes for Dip Finishing

Does summer heat have any effect on dipping enamels and varnishes after they are thinned down in the tanks? In other words, ought enamels and varnishes require more thinning in cold weather than in hot weather? The point that interests us is, should we get just as good results in the summer as we do in winter with the same amount of reducing.

We seem to be having more trouble in getting the same results in hot weather that we do in cold weather, using the same amount of thinner at all times. We do not feel that there is any change in the quality of the materials we have been receiving.

We buy certain air-drying enamels in red, green and yellow. We finish all metal parts in one coat, dipped, with an excellent gloss finish. On certain woods, we are able to obtain a good one-coat finish, with gloss, but on

## To Readers Of

# *Industrial Finishing*

This journal is designed especially to suit your particular needs and we want to know what information you desire, what problems or difficulties you have and how we can assist you in your work. It costs you nothing to make inquiries or to tell us what subjects you wish to see discussed in our reading pages.

Many times you have probably felt prompted to write some of your own experiencs, opinions or ideas. Now is your opportunity. INDUSTRIAL FINISHING solicits articles from practical men and pays for all acceptable material.

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Finally, thoroughly tested for uniformity of weight and quality, it is truly a pure shellac varnish of the binding quality so essential for fine and durable finishing.

Stille's guaranteed quality shellac carries our pledge of purity and uniformity. It is reasonably priced and prompt shipments are assured from prime stocks located at numerous trade centers.

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other woods we do not get as good results. This, we understand is caused by the different natures of the woods.

We reduce the enamels 50/50, that is, one part enamel and one part naphtha. During the day time, when the lids are raised on the tanks, we have no means of knowing just what amount of evaporation takes place. Consequently, after we have made the first mixture 50/50, we are not sure as to just what percentages would really constitute the mixture. This does not seem to make any difference during the winter months, but it does make a difference, or something makes a difference, during the hot months. We will be very much interested in any comments or suggestions that may be made.—A.B.F. Co.

---

Summer heat will have no effect upon dipping enamels and varnishes after they are thinned down in the dip tanks—that is in the sense that there is any chemical change in the materials. This heat will have quite a decided physical effect upon the dipping materials, however, by causing the viscosity to be lower.

Viscosity, as you may recall, is the resistance offered by a material to its particles slipping or flowing over each other. When some materials are cold they are very viscous, as for example, "Molasses in January" are very heavy bodied and viscous in cold weather. When the temperature is increased, the viscosity is greatly reduced and "January Molasses" become "July Molasses" in the summer months. Nearly all liquids become thinner in summer or when exposed to higher

temperatures than they are in winter or when they are cold.

Varnishes, paints and enamels are no exception to this rule. If you reduce your enamels equal parts in the winter months and get good results, you may not get good results with the same mixture during the summer months, due to the enamels flowing off more freely in the warm weather than in the cold weather. If this is the case, you should use a smaller proportion of thinner during the summer months than you do in the winter months.

The proper way of determining the viscosity of a liquid is by means of a viscosimeter, or an instrument for measuring the viscosity. Such instruments are of various types, but the simplest type consists of a small container with a definite size hole in the bottom of the container. By filling the container full and measuring the number of seconds required for the container to empty itself, an expression of the viscosity in numerical form is obtained. The material will run out of the container in a shorter space of time if it is hotter, or if more thinner has been added to it. Therefore, it is quite essential to have the material at the same temperature each time it is tested.

If it is not convenient to use a viscosimeter, it is possible to get a rough idea of the consistency of the mixture by using a hydrometer, so long as the same enamel or varnish and the same reducer is used. A "coal oil" hydrometer will be needed for testing varnish and an "acid" hydrometer will be needed for enamel. The hydrometer will sink to a definite point when a definite mixture of enamel and

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thinner or of varnish and thinner is tested—provided the temperature remains constant.

If the temperature becomes higher the same mixture will give a different reading on the hyrometer than if the temperature were lower. Hydrometers are usually calibrated at a temperature of 60-deg.F. If the material being tested is at a different temperature than this, the reading will need to be corrected for the temperature variation. These temperature corrections can be obtained from the makers of hydrometers.

Although it is not scientifically correct, nevertheless if you hold the hydrometer reading the same summer and winter, disregarding the difference in temperature of the materials, it works out fairly well in practice and you will get about the same results summer and winter. In other words you will use a little less thinner in your mixture during the summer than you do in the winter, regardless of the change in temperature. If the reading is "30" in the winter with a mixture of equal parts of varnish and thinner, you will have to use less thinner in the summer to hold your reading at "30" on the hydrometer.

Since you have no way of determining how much thinner is evaporated from your dip tanks and drain board, during a given period of time, the use of a hydrometer or preferably of a viscosimeter, will tell you when you have lost considerable thinner through evaporation and will permit you to determine how much thinner to add to replace that which has evaporated. If you add enough thinner to make the viscosimeter or hydrometer reading the same as it was when you

were getting good results your good results should return, provided the temperature of the material has not changed.—C. F. Merrifield.

## Lubricant for Oven Conveyor Bearings

Referring to the inquiry of D. B. (August, page 67) regarding the proper lubricant for bearings in oven conveyors, if the inquirer will communicate with the Acheson Oildag Co., Port Huron, Mich., that company can furnish him with an "Oildag" (graphite grease) that will solve his problem. The writer recently talked with an "Oildag" man who related a similar problem that he had solved for one of the big automobile factories which was having the same difficulty.—Frederick J. Pease (Clum Mfg. Co.)

## Sealer Coat Under Varnish

Referring to the question of H & O, which appeared on page 70 of August issue, regarding a sealer coat for use over varnish, I believe there is only one successful way of using spraying lacquer over old varnish or paint.

That is, to remove it before starting, thus saving a lot of time and much expense of doing so afterwards. Spray your old work with lacquer thinner and let it soak for a while; then blow it off with your air blower or duster.

If you are doing much old work you will find you will get better results by using the present day brushing lacquers, which can either be brushed or sprayed with an excellent finish.

It has to be a very cheap varnish that will lift under this

**The Blue Knight's Column**

**Technical men employed by large companies report that in the course of the year they do not get a single opportunity to discuss their finishing problems with competent lacquer men. It seems that Purchasing Departments, operated by non-technical men, erect barriers too high for lacquer experts to leap over.**

While it is true, that the average lacquer salesman, the same as the average anything else, serves only to waste your time when he does get it, there, nevertheless, is a marked necessity for working out some way of separating this chaff from the wheat.

I'm going to quote from correspondence with my customers to illustrate what can be done through an exchange of ideas, etc:

*"Some months ago your office called us to inquire whether we had clear lacquer which would stand outdoor exposure, and you will be interested to know that we have recently developed an outside lacquer for .....of Hoboken. Tests conducted by this firm and ourselves with lacquer indicated that when two coats were applied on birch, the finish would stand outdoor exposure without failure of any kind for at least 30 days. This feature alone makes it entirely different from any clear lacquer that has yet been put on the market. Whether it will stand further exposure, is a matter still to be tested. We will be very glad indeed to send you a sufficient quantity of this material for commercial testing."*

A real, understanding technical service can be a boon to the lacquer-using industries. If my laboratory or I can be of any service to you won't you drop a line to the Sales Dep't.?

**All names, materials and methods, etc., have been left blank here for obvious reasons but we will gladly supply them to you on request.*

The Blue Knight

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FINISHEEN gives the effect of a rubbed varnish job, at less cost; a durable finish requiring little sanding. Can be sprayed, brushed or dipped. Give it a trial.

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material. If used in colors, a coat of flat primer or white lead should be applied and left six hours. Before recoating, cut with turpentine. Or you can use the lacquer from the start. But if your undercoat has lifted any, spray and then sand the wrinkles and coat again.—John K. Cooper.

## Machine Buffing of Automobile Finish O. K.

In your July issue of Industrial finishing, (pages 44-52) I was amused to read an article by Doctor G. C. Given in which he believes that buffing is not being done in any automotive manufacturing plant. This is rather a sweeping statement, because every Ford model "A" car built, is polished, not by manual hand labor, but simply by buffing.

A certain make* of flexible shaft and polishing wheel has, so far, given the Ford Motor Co. the best results, and that type of wheel is most exclusively used at the present. Out in your own city (Indianapolis), per my instructions, a large and nationally-known manufacturer of "straight eights" has polished hoods for their automobiles merely by buffing—with a considerable saving in time and money.

The whorls that Dr. Given, claims "are plainly visible" after a rotary type buffing machine is used, are merely imaginary. After the job has been polished by buffing—either by a rotary type machine or by a reciprocating type machine—no whorls of any type are left on the job. In fact, buffed jobs are 100 percent better than the jobs that have been hand polished.

At the Ford Motor Co., two or

*Name on request.

three different types of materials are used on the buffing machines —soft cotton, soft sheepskin or soft silk—the last being the best.

I may also mention for your information that one of the largest body manufacturers in the city of Detroit, will, before long, be under contract to manufacture a small type body for a certain automobile company on a production basis. These jobs will not be hand polished, but will be polished by a buffing machine.—K. N. Kathju.

## Lacquer Flakes at Molded Edges

I noticed some time ago a wood finisher complained about lacquer peeling or flaking off around the edges of mouldings. Evidently he meant blistering. It is hard to tell the cause of this as he didn't explain his method of finishing nor state what undercoat he is using.

Paste fillers of an oil base, applied and rubbed off but not picked out of the inside corners adjoining mouldings, will cause blistering of the lacquer finish. Sometimes the trouble doesn't show up until after several coats are applied.

If a finisher is using colors and undercoats of some oil-base material and if this isn't allowed to get real dry and hard before lacquer is put on, he may expect this trouble to occur every time. Sometimes the over-coating of a moulding or bead will cause a blister, as the lacquer does not have a chance to level out and dry like it does on a flat surface. —J. K. Cooper.

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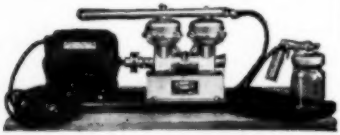

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## An Art Moderne Table

The occasional table of Moderne design, as illustrated here, is of pure French inspiration, and was one of the most successful Moderne numbers shown at the July Chicago market.

The top center is thuya wood, the lighter surrounding portion, Carpathian elm, and the straight grain darker border, Brazilian rosewood.

The scroll supports are solid walnut, as is also the top of the pedestal base. The dark portion of the pedestal is Macassar ebony; the next lower portion (mitered

Decorative features include figured woods finished natural.

moulding) is solid walnut; below this the vertical portion is zebrano, and the lowest portion is simply painted black.

Not an ounce of stain or filler is used in finishing the whole table, the entire finish being natural (pale wood lacquer).

Photograph is by courtesy of the Behnke-Fink Mfg. Co. of Chicago.

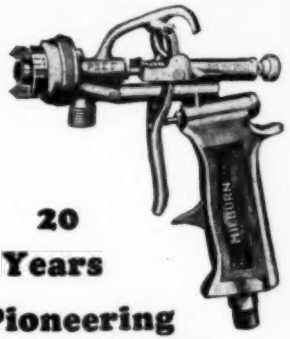
---

## Brightly Finished Toys

In the colorful finishing of childrens' outdoor toys, as produced in a number of toy-making establishments in the state of Washington, there are two factors paramount. The finish must be attractive and colorful; the article itself must be durable, that is of sufficient strength to withstand the usage that a normal, healthy American boy or girl will give it on sidewalk, playground or in the backyard.

Great importance is attached to finishing the wooden toy. Economy in the toy's production, (working the wood in the white) and proximity of the factories to the great natural wood resources —the savings thereby effected leaves, in some plants, sufficient leeway in the cost of production for spcialization on the finish of the article that will not only "sell" through its brightness, its colorfulness, its deep rich tones, but last and wear as it withstands the knocks and bangs of the irrepressible youngster.

While a tendency is noted towards the more general use of the air brush for spraying on finishes that dry quickly, nevertheless, many toys are still being tumbled in at least a first coating filler which closes the pores of the wood and provides a base or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smooth surface for some of the rich enamels into which the wood toys are dipped and later baked.

There is constant striving for improvement in finishes; each manufacturer realizes a personal problem, based on the particular kind of wooden toy he produces.

Diversity of colors, a wide range of them, a few, or a single standard color for his toys are primary factors when it comes to deciding on a finish, and whether dipping, spraying, enameling, baking or lacquering shall be employed. The rate of production is another element of the situation for the shrewd manufacturer who studies his own product and his costs, as balanced against the demand and his actual and potential market.

In most cases, toys are a seasonal product, made in the summer, on orders received in the spring, and turned over to the wholesale and retail distributors in the fall for winter sale. Usually there is ample time to go about the manufacture and finishing, and considerable time is allowed the factory for making actual delivery.

It is another matter, however, to watch carefully manufacturing costs and the rate of production and finishing of toys when the plant is in actual operation in the summer. Once the factory begins operation, production should not drag or become too leisurely despite the time allowed for delivery, for if this occurs, labor costs mount and seriously effect possible profits.

Finishes must be applied as quickly as possible so far as labor is concerned and they must be bright and durable, for once the brightness has gone, the toy loses its attraction.—C. M. L.

## Add Guns and Containers for Variety of Finishes

One concern that does all its finishing with the spray system, uses a variety of finishes including bronze powders, enamels and lacquers. The management wanted to increase production in the finishing department, but was not prepared at the time to install additional spray booths.

The original equipment at each spray booth consisted of one gun for blowing off dust and another gun for spray work. The work was such that many small jobs of different kinds came to each sprayman. For example, one job would be straight lacquering; then, perhaps, the spray operator would have to use bronze powder, then enamel, then a different bronze powder again, and so on. This necessitated frequent changes to the different kinds of material used.

In order to reduce the length of time and amount of work required to make so many changes, the first move was to provide each sprayman with 12 one-pint containers, each to hold a different mixture. Second, five guns were provided for each booth. These hang on a set of hooks, one gun to be used for cleaning the work, the other four to be used for spraying different mixtures.

Now, when clear lacquer, bronze powder, or enamel is needed for a large run, gallon containers are at hand to be hooked up as needed. Probably, as business increases and the plant expands, the several containers will be done away with altogether at the seperate booths, and a series of pressure tanks or some other form of container may be installed—and each tank may be piped to the separate

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booths. Then each sprayman will have on hand just what is needed for every job and he will not have to spend any time mixing materials and connecting containers. However, the present system represents a substantial and economical improvement over the methods formerly employed.—Ben Allen.

## New Pressure Container Has Interesting Features

The Hopkins Spray Equipment Co., of Chicago, Ill., announces a new pressure container designed especially to eliminate spray dust in connection with modern spray finishing.

Equipped with dual, multiple-air regulation, independent regulation of air for the gun and container is made possible. The pressure in the container can be raised as high as required for heavy materials, while at the same time the pressure at the gun

Right: One of the new pressure containers equipped with double air regulation, water separator, hand agitator and insert container.

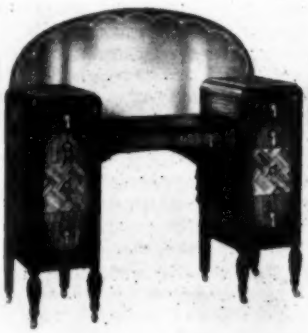
Left: Air motor agitator used where the settling of pigments causes trouble in color changing, due to separation.

can be kept at a point low enough to practically eliminate all spray dust and subsequent wastage of material.

A mechanical agitator made in two types—hand or air-motor operated to prevent pigments from settling to the bottom—has been made a feature of this new container. The air-motored agitator is particularly useful when heavy-pigmented finishes are being used; it can be run at various speeds by adjusting the air valve.

To avoid water getting into the finishing material—due to moisture condensation between the compressor and container—a water separator is included in the head of the container.

These containers are drawn from one-piece steel plate and are tinned inside and out to prevent rust. They are made in sizes ranging from 3 to 60 gallons.



An article in Art Moderne furniture, as exhibited at the Chicago Market in July. Moderne veneer, showing cross-figured Oriental walnut, appears above and below the center design, which consists of small squares of zebra wood, with the grain running in opposite direction to bring out the lattice effect. Courtesy Rushville Furniture Co.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## Rough Wiping Paste Wood Fillers

One of the greatest advantages in wood finishing is to know the facts of what material works satisfactorily and quickly, and gives practical service all the time. It is true that satisfactory results can be obtained at times with makeshift appliances and material, but in these days, when production is of such vital importance, the above mentioned points should be determined.

As an example, take the rough wiping of paste wood fillers. At a not far distant past shavings, excelsior, tow and burlap were the well known and the best materials for rough wiping filler coats.

They were satisfactory in their time, in that they worked faster and better than wiping cloths did in this operation.

But today, there are materials more adaptable for this purpose, I have in mind such materials as "Fillerub" and Sea Moss. Either one will prove satisfactory to the most critical workman, and they are being extensively used for these purposes in wood finishing.

As to removing the surplus filler, they not only are superior to anything else in my mind, but an additional advantage is that they are economical to use, relatively low in cost, and the fire hazard is lessened.

With a paste wood filler properly constructed for the work at hand and well packed in with the brush—as the harder it is brushed the more certain it is that the filler is being packed down to really fill the pores—these rough wiping materials will cut off only the top at the surface, leaving the pores well filled.

Again, these materials help to

quickly remove all excess filler on the work that is not in the pores of the wood.

Naturally the proper way to do this is to rub across the grain, as in rubbing with the grain much of the filler would be pulled out of the pores again.—E. C. H. Rottman.

## Lacquered Wood Patterns for Foundry Service

For several years I have been concerned with wood patterns for making metal castings. The matter of coating those patterns, so that they would retain their size and shape, has been more or less of a problem. Every salesman for supply houses has had "just the right" grade of shellac to sell, but the final solution seemed to be the use of any of these and at least one application every time the patterns came in from the foundry.

The recent disastrous flood in Vermont brought out a most interesting thing about pattern coatings. Springfield is the home of some of the most famous machines made in this country. These several plants get their castings from a foundry down in the valley below the hilly city. During the flood, the foundry was inundated and patterns by the hundred went careening down the stream.

One company, whose patterns were washed away, was able to make some interesting observations after the flood had subsided —when they had rescued such as could be found upon the banks miles below. Their older patterns had been shellac coated but more recently, they had been coating with a brushing lacquer.

The remarkable thing about the pattern recovery mentioned was

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that every one of the lacquered patterns was straight, true to form and showed no signs of opening in any of the joints. The shellacked patterns, on the other hand, had started opening at all the glue joints and had suffered badly by the absorption of water.

Having already learned that lacquered patterns were much easier to mold and that they maintained a smooth surface longer than shellacked ones, it remained but for the severe test of this flood to clinch the argument in favor of lacquer. When the joints of a pattern open, the pattern loses its size and shape; much trouble follows therefrom. It appears, therefore, that lacquer has proved to be much more impervious to water and has shown a lasting elasticity such as the shellac used did not.

Molding sand must be dampened to work with. The wooden patterns are imbedded in that sand; they are pounded and jarred and finally chucked out to dry; pretty hard treatment! The writer remembers seeing a man in one foundry take the patterns to a cleared space and turn the hose on them to wash off sand; then, the patterns were set up against the steam pipes to dry! Surely, a treatment that would kill or cure.

If lacquer is a finish that will stand the ravages of foundry service, then it is the coating par excellence for them. The slightly higher first cost will soon be wiped out by fewer repairs and decreased machine shop costs.—Albert Ackerson.

---

A well pigmented lacquer in the darker colors is a close rival of any of the long-oil enamels, in point of covering power.

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# Finishing Metal Beds

***Head grainer of the Evansville Metal Bed Co., explains some of the methods used in color-enamel bake finishing, wood-grain reproduction, lacquer finishing and ornamental decoration, as applied to the finishing of metal beds.***

**By George Moskos**

CAREFUL CLEANING of the metal surfaces is the first step necessary in the finishing process. Grease should be carefully removed, for if allowed to remain it will cause trouble when the priming coat is applied. To avoid any such trouble the parts and assembled units are sent through a cleaning solution prepared with hot water, after which the surfaces are carefully rinsed and wiped clean with clean dry rags. Then they are placed in a flat tank containing a specially prepared priming compound, to prevent sags and runs and to give the surfaces a proper coating.

Following the priming operation, the parts are hung to carriers operating under an overhead track provided to facilitate speedy movement to the ovens, where they are carefully stacked and baked at 300-deg. F. for three hours. They are then allowed to set until the following day when they are distributed to the paint, graining or lacquer rooms, depending upon the nature of the finish to be used.

### Color Enamel Finishes

After the baking of the priming coat, all metal surfaces are sanded with No. 00 flint sandpaper. The cheaper beds are sent through the dipping process. The ordinary colors used on this style of beds are white, green, gray, blue and wood brown. After being dipped, the articles are placed on separate pinrolls* to prevent adjoining surfaces from touching. They are then placed in the oven and allowed to bake for three hours at a temperature of 185 to 200-deg. F. Beds finished in lighter colors and requiring a third coating are returned to the dipping tanks the following day and are given a final coat.

The price of a completed bed depends to a certain extent upon the number of coats of finish applied. As many as two or three coats are used on some beds. In addition, certain beds require striping, oxidizing, decalcomania decoration; some require a coat of clear varnish to protect the striping and decorating. On the more expensive beds it is necessary to use hand brushing and combination colors.

### Vernis Martin Process

A spray finish rarely used, is the Vernis Martin. In this process the articles are placed in an oven and baked for 3½ hours at a temperature of 300-deg. F. As many as 100 beds are placed in one oven. The units are then taken from the oven and wiped with clean dry rags, after which they are sprayed with a coat of glaze and baked again for three hours at 200-deg. F., but not long enough to turn the beds too brown.

*Lengths of iron pipe (15-ft.) with round iron pegs projecting out 4-in., and spaced 4-in. apart.

### Imitation Wood Finishes

The finishing of metal beds in imitation of wood grain and color has been gaining in popularity recently. Reproductions of practically all woods are offered—oak, American walnut, Russian walnut, high-lighted walnut, brown mahogany, red mahogany, French walnut, gum and birdseye maple.

In this process the metal surfaces are first sanded with No. 00 sandpaper and then dusted clean with rags. After the beds have been sprayed with a priming coat they are run through the different "grounds". The ground colors are purchased in specially prepared five-gallon buckets and come ready-mixed in the various shades and colors. This insures absolute uniformity of colors and shades all the time. After this application, the beds are sent to the oven where they are allowed to bake about 3½ hours at a temperature of 250-deg. F.

From the time the beds leave the ovens after the baking process, and go to the graining department, the work is done entirely by hand. First, the surfaces are sanded with No. 00 flint sandpaper, then cleaned and dusted with rags. Then they are taken to the benches where a thin coat of stain is brushed or sponged on. Application of the graining color is made by use of sponges of various sizes and shapes.

### Walnut Finish

A specially made sponge is used to apply the graining color on the metal surfaces. The figure of the wood is imitated by skillfully using a sponge to wipe out some places, then using a special graining brush. Some of these graining brushes are called "mottlers" while others are designated as "growth" tools. Camel's hair pencil brushes of various sizes are used for veining.

On the fronts of the beds, all the walnut graining is exactly imitated like wood furniture. After the beds have been finished in this way, a striping tool made of rubber is run over the main posts, along the edges, to bring out the beautiful double stripes—what we call "wipe out" lines.

The American walnut and satinwood combinations, also those of walnut and birdseye maple, require real art and skill to reveal the two different kinds of wood in proper contrast. A real decorator is employed to do the striping and free-hand decoration.

### Mahogany Finish

In finishing beds in mahogany, this finish first takes the water colors in distemper (diluted or mixed with vinegar and water) and then a big stippling brush is used to put on the mahogany wood effect. After the stippling operation the grainer applies an oil stain and puts on fine veining lines, after which the whole bed takes blending and comes out nearly a perfect imitation of mahogany. Before the bed leaves the benches, the double stripe of the corners is brought out with special tools.

### Oak Reproduction

In oak finishing, the metal surface is stained and then a steel comb, placed inside a cotton rag, is run over it for the purpose of graining. In the case of the more expensive models, a process of overflaking is followed that more nearly imitates the real quartered oak. At this stage, two-toning is also done, taking place in the same operation as the graining.

## Preparing Metal Parts for Perfect Enameling and Painting?

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After the graining process, each separate piece is sent to the ovens and baked for about 4½ hours at a temperature of 275-deg. F. Following this, the beds are wiped with a clean rag, sprayed with varnish and taken to the oven again where they are baked for 4½ hours at 250-deg. F. The next day all beds are sanded with "Water-rub" sandpaper No. 32. Then all panel beds are striped and decorated, and a coat of varnish is sprayed on. They are placed in the oven a third time and baked 4½ hours at 250-deg. F.

On the day following the third baking the finished surfaces of beds are rubbed and polished. The amount of rubbing and polishing they receive depends upon the price they command, the more expensive one being given more careful work, of course.

**Lacquer Finish**

The process followed in lacquer finishing is entirely different. First the metal surfaces are sandpapered, cleaned and sent to the spray booth where they are sprayed in any color or shade desired. They are returned again after an hour and given a second coat and, after drying an hour they are ready for striping.

Following the striping operation, each bed is sent to the spray booth for shading and then to the decorator where all spindles are decorated. Finally they go to the spray booth for a clear coat of lacquer and then to the decalcomania room. All operations in this process must be performed in seven hours.

The springs are first taken to the dipping tank where they are dipped and put on an overhead track provided to speed up their travel.

Black springs are baked in gas heated ovens for 2½ hours at 250-deg. F.; gray and blue springs are baked in steam heated ovens for three hours at 250-deg. F.

## Vary Air Pressure To Suit Type of Material

Various types of finishing materials require different air pressures in spraying. Such material as stipple lacquer requires a very low pressure (10 to 20-lbs.) and a special wide nozzle. The lacquer, in this case, is not atomized, but merely deposited on the work in small drops instead of a steady flow.

For bronzing liquids and lacquers which are of low viscosity, 30 to 40-lbs. pressure is used. For furniture lacquers, 50 to 75-lbs. has proved the best for the writer. For lacquer enamels, fillers, primers, etc., the pressure varies from 60 to 120-lbs.

There can be no set rule for air pressure used. It must vary according to the nature of the lacquer. One enamel may spray successfully at 60-lbs., but when sprayed at 100-lbs., it will cause too much spray dust. Another enamel may be sprayed successfully at 100-lbs. or more and a very smooth surface, entirely free from orange peel and dry dust can be obtained. High-boiling solvents predominate in the latter enamel, not being as volatile as the first. An intelligent spray operator soon learns to know what pressure is best for each material.—E. B. Smethers.

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There are numerous examples to prove that the larger some badly-managed businesses grow in volume, the less are the profits. The prosperity of our country is built upon industrial profits.

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# A New Decorative Finish And How To Use It

***Chief Chemist of Flood & Conklin Co., describes a new finish for use as a baked finish on metal, wood or other materials, and explains in detail how to use it successfully in producing a variety of novel and attractive effects.***

**By Frank B. Root, Ph.D.**

WITHIN the past 18 months there has been developed a new finish that is not only unique but beautiful and practical as well. This new finish has been named "Damaskene" because it brings to mind, through its similarity of effect, the beautiful textile damask—"a rich silk fabric woven in elaborate patterns having a raised appearance."

Damaskene is a varnish product which is sprayed on an article and baked. Under the influence of oven heat it gives a raised effect whereby the surface is broken up into a series of wrinkles or folds. This produces an intricate pattern—countless lines that go "every whichway"—and has a rich shimmering quality.

There are many features which make the new finish interesting and attractive. It is durable, easy to apply and beautiful. Since it is a *raised* finish as opposed to a *smooth* one, the surface to which it is applied needs no special preparation, except to be cleaned of all dirt and grease. Minor imperfections of the surface to which it is applied are masked by the raised design of the finish. Used directly over bare metal, this finish has firm adhesion and is very hard. It does not mar easily and it holds its luster remarkably well.

## Baking Conditions

As to baking conditions, any kind of oven is suitable that gives a uniform heat—gas, steam, electric. Foul gas is not needed, and this simplifies the baking process. The article should go into the full heat as soon as convenient after being sprayed. As a rule the finish should not be allowed to airdry for more than half an hour. Any temperature can be employed from 160 to 400-deg. F. The lower the temperature the longer the article should be baked, in order to attain suitable hardness, and vice versa. The following is an approximate time schedule for the finish at various temperatures:

| | |
|---|---|
| Five hours | 180-deg. F. |
| Three hours | 200-deg. F. |
| Two hours | 250-deg. F. |
| One and a half hours | 300-deg. F. |
| One half hour | 400-deg. F. |

The baking temperature has some effect upon the size of the wrinkles; a low temperature tends to give coarse wrinkles and high temperature finer ones. The effect, however, is usually not very pronounced.

The new finish can be used on practically every kind of material, with beautiful results—metal, glass, porcelain, fiber, paper, etc. When used on metal, the only precaution is to be sure the surface is free from grease and oil. Grease will sweat out on the

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surface of the coat during baking, and prevent the wrinkling. As a result, smooth, glossy spots show up.

This finish can be applied successfully to rough castings, the raised surface of the finish effectually hiding the roughness of the metal. Here, however, it is better to knife the larger pits and depressions with putty glaze before applying the finish.

New developments along the lines of a material that wrinkles at a low temperature makes this low-bake material a practical finish to use on wood. Here, however, it is necessary to specify seasoned wood that is free from pitch, as for example, maple. On woods like cypress, a surfacer to act as a sealer must be used.

### Applied by Spraying

The usual method of application is by spraying, although gasket dipping is practicable on such objects as rods. Brushing and dipping have been tried, but these methods are suitable only for small objects.

While being applied, this product is considerably heavier in body than the usual spraying material. This characteristic, together with the solvent mixture, is responsible for eliminating most of the sagging that would result if too heavy a coat of the material were sprayed on. Any apparent failure to level out after being sprayed is rectified as soon as the object is placed in the oven, since the surface flows together as soon as the heat strikes it.

The coat must not be sprayed on too thick. In this case it takes longer to bake; the wrinkles are coarse and usually not uniform. Also there is the possibility of sagging on an upright surface. On the other hand, if the article is sprayed with too thin a coat, no wrinkles will form. However, the margin between these two extremes of coat-thickness at which satisfactory results are obtained, is rather wide, and any careful sprayman with a little practice can turn out satisfactory work.

When applied in a coat of suitable thickness, a gallon of this undercoat will cover about 260-sq. ft. No thinning is required unless an opened container is allowed to stand and become thick through evaporation of the solvent. Then it can be thinned to the original body with undercoat thinner furnished for this purpose.

### The Two-Coat System

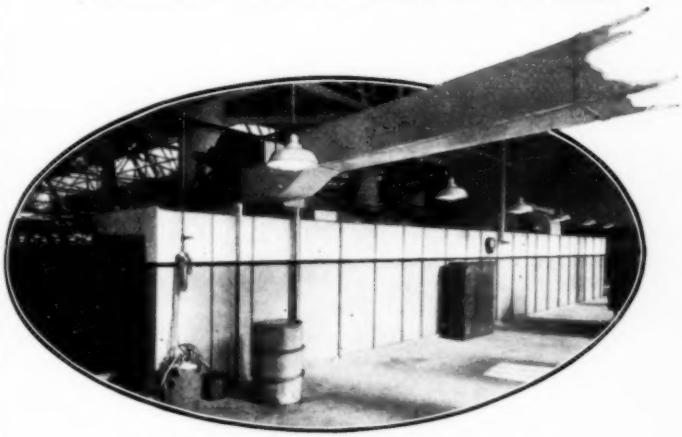
At present there are two systems of finishing with this material, using one or two coats. The two-coat system is more practical and also offers a larger variety of pleasing effects. It consists of an undercoat sprayed on and baked. This is followed by a coat of lacquer enamel which is air-dried. The necessary undercoat is used to give the wrinkled pattern and the lacquer enamel goes over the top of this in a thin film to give the color that is desired.

The importance of baking the undercoat hard enough is seen here. If the article is allowed to stay in the oven too short a time, or if the temperature is too low, the lacquer solvents soften the undercoat and lift it. If the undercoat is baked too hard, there is a tendency for the lacquer to strip from the undercoat. But no difficulty is encountered if the approximate schedule given above is followed.

The lacquer enamel can be of any color in either gloss or flat.

(Continued on page 117)

# Finishing Operations on an Economical Production Basis



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## EDITORIAL

### *Future Foreman Finishers*

The problem of obtaining good all-around finishers to take charge of finishing rooms is ever present with manufacturers.

As finishers of the old school grow older they are replaced by younger men. Manufacturers often make the mistake of employing a young man who perhaps is full of life and "pep", but who lacks the necessary knowledge of men and methods.

These same manufacturers, in their great eagerness to obtain maximum production, will sometimes hire a man who has the reputation of being a "go-getter" and in some cases a "driver", but who is woefully lacking in the fundamentals of finishing materials and processes.

Young men who believe they have the personality, tact and the other qualifications necessary to handle a large group of men, should go into the finishing room and learn practical staining, filling and so on, until they have served an apprenticeship in every branch of the finishing process.

After a thorough preliminary training they should start their executive activities by taking charge of a small shop where responsibility is not so great. From the small shop they can work into a larger one and in this way grow up with the industry.

It is my belief that as the ability and character of the foreman finisher increases, so will his remuneration. It is true that in some instances foreman finishers with great responsibility are underpaid, but this is usually their own fault. They are either lacking in something, or they do not possess confidence in themselves. Often a suggestion will awaken the manufacturer to his responsibility. —Salesman.

### *Many Concerns Still Troubled With Blushing*

Again this summer several manufacturers who use lacquer finishes have complained of trouble due to their finish blushing after it had been applied. This problem of blushing is not a new one to the lacquer manufacturer nor to the lacquer user, but satisfactory means have been developed for effectively preventing it and for treating blushed finishes when suitable preventive measures were not taken to avoid blushing.

Articles published in past issues of INDUSTRIAL FINISHING have revealed causes and recommended measures for the prevention and treatment of blushing; also, the

majority of lacquer manufacturers have developed materials and methods for this purpose. Sometimes one thing and sometimes another causes blushing; frequently it is a combination of causes. All conditions must be taken into consideration before specific recommendations can be made for the prevention or treatment of blushed lacquer surfaces.

As a result, the service man or expert who can get into closest touch with the situation and learn all the facts—this man usually is best qualified to recommend an immediate and economical solution for the problem, provided he is not influenced by some motive or purpose which is allowed to take preference over the best interests of the lacquer user.

---

### *When Satisfaction is Registered, Learn Why*

An old saying it is to "let good enough alone," but today new conditions prevail and some maxims of old wisdom must be modified. For example, consider the manufacturer of finishing ma-

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terials or finishing equipment. Formerly it was the policy, after customers had been acquired, to be concerned only with those who registered complaints, or where it was learned that some trouble had occurred. When everything was satisfactory, or seemingly so, the easiest and apparently the logical thing to do was to "let the customer alone."

Many valuable lessons can be learned by keeping in close touch with satisfied customers. In taking advantage of what is learned through this contact, the progressive concern can reduce the rate of "customer turnover" and should be able to add new accounts more easily and with greater assurance of keeping them permanently.

Satisfied customers are wonderfully effective assets. Really, the factories of satisfied users of finishing materials and equipment may be considered as so many friendly testing laboratories where much important information is continually being uncovered, including suggested improvements, new adaptations and specific features of merit that could be profitably employed to add new attraction and effectiveness to the advertising sales literature and selling arguments.

Frequently a concern can plan more intelligently and hold a greater volume of desirable business by investigating and continually keeping in close contact with its satisfied customers, than by devoting so much attention to customers who register complaints or manifest dissatisfaction.

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Where good general illumination is needed, white or very light colored walls and ceilings are desirable.

(Continued from page 112)

Bronze powders of various shades in bronzing liquid may be sprayed over the wrinkle finish undercoat; or bronze powders may be added to the various lacquer enamels and sprayed on. Really, the number of colors and bronze effects that may be obtained in this way is almost infinite.

The undercoat suitable for this finish can be obtained in any of a variety of colors. After the color of the finishing lacquer has been selected, it is well to choose an undercoat of a color approximating that of the lacquer. In this way the undercoat is covered more readily and a thinner coat of lacquer is permissible. A thin coat of lacquer makes the finish stand out better than when a heavy coat is used, since the valleys of the surface are not filled with lacquer.

### A Modification of Two-Coat

A modification of the two-coat system is to apply a coat of suitable enamel. After this coat has been baked, it is sprayed or brushed with the proper mixing varnish to which has been added a bronze powder or a pigment such as burnt umber or lampblack. Before the varnish has time to dry it is wiped off the high spots and the material remaining in the valleys of the pattern produces a beautiful effect.

Another two-coat method which gives pleasing effects is to bake on a coat of the enamel and finish with a coat of clear lacquer containing pearl essence. Applied over any selected color, the pearl essence produces a soft, pearly shade; over black, gunmetal is obtained.

An interesting way of producing a color that changes in shade, depending upon the angle at which it is viewed, is to spray or spatter the baked wrinkle enamel from one side and almost parallel with the surface, with an harmonious or contrasting shade of lacquer enamel. This covers only one side of the wrinkles with the second color and the effect is similar to the changeable colors in some silk goods.

### The One-Coat System

The one-coat system consists of a single coat of the proper enamel in any one of a variety of colors, which is sprayed on and baked. This furnishes a cheap, durable and attractive finish, but a one-coat job does not lend itself to the unique and artistic effects that can be secured when two coats are used as described above. The one-coat system also requires more care in the baking of the lighter shades, since there is a darkening in color if the finish is baked too long, and a lack of uniformity in color if one part of the oven is at a different temperature from another part.

The clear finish is the same as the undercoat, except that it contains no pigment. It can be used as an undercoat, as a one-coat finish, or as a finishing coat over another color. As an undercoat, it is used the same way as the colored products, the only difficulty being that it is harder to spray on evenly, since it contains no pigment.

It can be used as a one-coat finish over bright metal and gives the effect of brass work, since it is amber colored after it is baked. As a finishing coat, it is used over a ground color coat and baked. The clear material can also be tinted with suitable dyes and applied where a transparent finish

is desired as, for example, on parchment lamp shades or electric light bulbs.

As to the general uses for this new finish, a few articles to which it has been applied include radio cabinets and speakers, burial caskets, hand-set telephones, phonographs, metal stands, radiator enclosures, lamps, motor cars, boxes, metal clock cases, smoking stands, counter scales, electric fixtures, cash registers, flash lights and countless examples of decorative and practical novelties.

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